Microbial colonisation of follicular fluid: alterations in cytokine expression and adverse assisted reproductive technology outcomes

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Previous studies have measured cytokine expression within follicular fluid collected at the time of trans-vaginal oocyte retrieval and compared the profiles with the aetiology of infertility and/or successful or unsuccessful assisted reproductive technology (ART) outcomes. Seventy-one paired follicular fluid and vaginal swab specimens collected from ART patients were cultured to detect microorganisms and then were tested for the presence of cytokines by multiplex fluorescence bead assays. Specimen selection was based on two criteria: whether the follicular fluid specimen was colonised (with microorganisms prior to oocyte retrieval) or contaminated by lower genital tract microflora at the time of oocyte retrieval and; the aetiology of infertility. Patients included fertile women (infertile male partners) (n=18), women with a history of endometriosis (n=16) or polycystic ovary syndrome (n=14), or couples with a history of genital infection (n=9) or idiopathic infertility (n=14). Microorganisms and cytokines were detected within all follicular fluid and vaginal swab specimens tested. Cytokines were associated with successful fertilisation (IL-1α, IL-1β, IL-18 p=0.05–0.1; VEGF p=0.05–0.001) and embryo transfer outcomes (IL-1β, IL-6, IL-12p40, GCSF, IFNγ p=0.05–0.1) as well as the aetiology of infertility (IL-1β, IL-4, IL-6, IL-8, IL-10, IL-12p70, IL-18, GCSF, MCSF, LIF, TNFβ). Colonising microorganisms were associated with decreased fertilisation rates for fertile women (p=0.0002), and women with infertility due to endometriosis (p=0.0002) or polycystic ovary syndrome (p=0.002). Colonising microorganisms were also associated with decreased pregnancy rates in women from couples with idiopathic infertility (p=0.001).

Follicular fluid is not sterile and distinctive site-specific cytokine profiles result when microorganisms colonise follicular fluid. Microorganisms colonising follicular fluid and the ensuing cytokine response could be another cause of infertility. Vaginal and follicular fluid cytokine expression is dependent on the aetiology of infertility and the presence of microorganisms at these sites and could be useful in predicting ART outcomes.